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to be of the more powerful sex;" and Thury of Geneva believed that the moment of fertilization relative to the maturity of the ovule, exercises a decisive influence on the sexuality of the product, the ovules fertilized earliest producing females, and those fecundated at a later period producing males. Professor Hoffmann of Giessen has recently attempted to test the truth of this theory in the case of diœcious plants, the species on which the experiments were made being *Spinacia oleracea*, *Mercurialis annua*, *Lychius vespertina*, and *Rumex acetosella*. In each case the female plants were separated into two portions, one being fertilized artificially as early as the stigmas were developed, the other after they had been mature for a considerable period. The result of his experiments was, on the whole, decidedly opposed to Thury's theory; nevertheless he found that the period of fecundation had an unmistakable influence on the plant; and also that a remarkable difference exists between the results of artificial and of natural impregnation which he was quite unable to account for.—A. W. B.

DIATOMS IN THE HOT SPRINGS OF NEVADA.—Dr. Blake exhibited, before the California Academy of Sciences, under a powerful microscope, specimens of Diatoms from a hot spring in Nevada, the temperature of which was one hundred and sixty degrees. Dr. Blake said they were more numerous there than in any other locality, six or eight hundred occurring in a bit of mud the size of a pin's head. Most of them were identical with the fossil species described by Ehrenberg, from near Salt Lake, but many were new. He mentioned particularly the red algæ, living in the spring and found in salt beds in many parts of the world. He found about fifty-two species, of which thirty are the same as Ehrenberg's, who mentions about sixty-eight.

ZOOLOGY.

FOSSIL MESOZOIC MAMMALS.[*]—The interest which in the year 1854 centred around the important discoveries of Mr. Beckles in a small and apparently insignificant seam in a scarcely noticeable stratum of the upper Oolitic series has during the past few months risen to satisfaction at our knowledge of the fact that the specimens derived from the Purbeck beds have been at last fully and entirely described by Professor Owen. Sir Charles Lyell eloquently and suggestively pointed out, with reference to the importance of the Purbeck discoveries, "when the geologist inquires if any land animals of a higher grade than reptiles lived through any one of these three periods, the rocks are all silent, save one thin layer a few inches in thickness. This single page of the earth's history has suddenly revealed to us in a few weeks the memorials of so many species of fossil mammalia that they already outnumber those of many a subdivision of the tertiary series and far surpass those of all the other secondary rocks put together!"

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[*] "Monograph of the Fossil Mammalia of the Mesozoic Formation." By Professor Owen, F. R. S., D. C. L. (Printed for the Palæontographical Society. 1871.)

In this locality Mr. Beckles worked for many years at his own expense; and the result was the discovery of an extensive series of fossils, which were placed in the hands of Professor Owen for description. Some of these in the meanwhile were described by other palæontologists; and a controversy was carried on, both in the "Quarterly Journal of the Geological Society" and in some ephemeral publications, as to the nature and value of the principal genus of mammalia that was discovered in the Purbeck "dirt bed."

This species, *Plagiaulax*, contained in itself one of those text-examples on which the truth and verity of all our physiological deductions may rest. And it is rather with a view of offering our readers some notion of the intellectual canons on which a scientific man may determine the affinities of a species than of describing the form itself, that we briefly call attention to what, perhaps, is one of the most interesting genera which modern science has unveiled to us.

The jaw of a very minute animal presented, as was thought by Dr. Falconer, its original describer, some points of analogy with the characters exhibited by the jaw of the kangaroo-rat (*Hypsiprymnus*), and much controversy was expended at the time of its discovery and shortly afterwards, as to the precise value of those features which led one eminent scientific man (alas! since deceased) to affirm from the form of the jaw and shape of one of the teeth that it was an herbivorous animal; while Professor Owen, on the other hand, declared it to be a carnivorous marsupial. That two such eminent men could in this way differ on the most simple, the most elementary, and the most obvious fact in the science, naturally leads students to suspect either that the infallible canons of the science of palæontology must be wrong, or that errors both of fact and of definition must have been committed by one or other of the intellectual combatants.

Varius Sucronensis ait, Æmilius Scaurus negat; utii creditis, quirites?

Though the species of animal, therefore, is of trifling dimensions, and though the technical argument is too complex to be entered into on the present occasion, we must examine how far the canons of the science have been obeyed. Cuvier has said, "La premiére chose à faire dans l'étude d'un animal fossile, est de reconnaitre la forme de ses dents molaires; on détermine par là s'il est carnivore ou herbivore." The few and small molars of *Plagiaulax*, however, bore no relation whatever to the like molars in any other herbivorous animal; while many other characters—*e. g.* the cutting and salient angle of the molar and premolar teeth; the broad, high, and nearly vertical coronoid process; and the very low position of the articular condyle—amply demonstrate to the satisfaction of Professor Owen and his disciples the absolute reverse of Dr. Falconer's theory. Plausible as the latter was, resting entirely on the apparent resemblance of one solitary tooth (and that one not even a molar) with the premolar tooth of the kangaroo-rat, the words of Owen are amply confirmed, "that the prominent appearances which first catch the eye and indicate a conformable conclusion are deceptive; and that the less obtrusive phenomena which require searching out, more frequently when their full significance is reasoned up to, guide to the right comprehension of the whole. It is as if truth were whispered rather than outspoken by Nature."

The lesson, therefore which students ought to learn is that the true affinities of an animal do not lie on the surface of the specimen; that one solitary premolar tooth is inadequate on which to found a theory of the "saltatory" nature of the animal to which it belonged; and that the theory of Dr. Falconer, adroitly though it has been supported by many apparent or accidental coincidences has not stood its ground before the more elaborate, more profound, and at the same time more simple interpretation of the affinities of *Plagiaulax* originally suggested by Professor Owen.

After the lapse of some years (in fact since 1847) the oldest known mammal is still the *Microlestes* of the Triassic beds of Wurtemberg. This perhaps bears some slight resemblance to

Plagiaulax, although the allegation of affinity between *Plagiaulax* and *Microlestes* rested upon one of those "hasty blunders" which detract from the safe and accurate progress of any science. Professor Owen we believe on one occasion ("Palæontology," 1st edit., p. 302; 2nd edit., p. 339) pointed out that some of the teeth of *Plagiaulax* bore resemblance to some teeth in *Microlestes*, in a sentence which was plainly and lucidly expressed. The incapacity as it seems, to apprehend the meaning of an ordinary sentence leads us also to doubt the capacity of judging of the nature or degree of the demonstration of the affinity of *Plagiaulax* to *Hypsiprymnus* which a superficial observer may believe himself to find in the more exact writings of Falconer or Flower.

Relegating, therefore, the unhappy little jaw of *Plagiaulax* far away from the sect of the "Jumpers" (*Saltantia*) to its proper position in the scale of insect or flesh feeding marsupials, associated with its congener, the large marsupial tiger of Australia (*Thylacoleo carnifex*), the affinities of which as a *bona fide* carnivore Professor Owen also amply proves, we have to glance at the number of new forms of animal life described by Professor Owen in the present memoir. Eight new genera of mammalia and seventeen new species are described in detail, all of which afford marked points of distinction from anything of which the palæontological student in his wildest day dreams could have ever realized. Nearly all of these forms are unquestionably marsupial and allied to the pigmy "opossums" of Australia, differing not only from each other, but from anything previously known to science. We can only wonder at the enormous amount of variety of "differentiation" which appeared at so remote a period of the earth's history, and the mode in which the places which nowadays in the Dorsetshire fields are filled by moles, hedgehogs, and shrewmice, were, at the time of the deposition of what is now called the "Purbeck bed" occupied by animals which, while they closely resembled in many of their characters the existing opossums, yet differed from them in retaining the more "generalized" type, from which it is not merely rational but probable to believe that our forms of marsupial animals existing at the present day have sprung.—*Pall Mall Budget.*

FORMER EASTWARD RANGE OF THE BUFFALO.—The occurrence of the buffalo in Virginia up to the close of the last century, can be substantiated beyond question. Surgeon J. Simpson, U. S. A., who was well acquainted with Nathan Boone (son of Daniel Boone the pioneer, and then a captain in the service*), informs me that he had the fact, in 1843, from Nathan Boone himself, who killed Buffalo in Virginia in 1793–'97–'98.

Dr. Simpson has handed me a letter addressed to him by Dr. Charles McCormick, Surgeon U. S. A., dated Fort Gibson, Cherokee Nation, August 18th, 1844, in which the particulars are given. The occasion for that part of the letter which relates to the buffalo arose in this way:—An officer to whom Dr. Simpson mentioned Capt. Boone's statements being inclined to doubt them, Dr. Simpson wrote to Dr. McCormick, desiring the latter to ask Capt. Boone, who was then at Fort Gibson, to put the facts in writing. This, it seems, Capt. Boone promised to do, but neglected to keep his promise, owing, probably, to the singular indisposition of men of his class to put anything on paper. The following extract, however, from the letter in question, is sufficient:—

> "I have just seen Capt. Boone," writes Dr. McCormick, "and he promises to write and tell you all about it. In the meantime, he says he killed his first buffalo, somewhere about 1793, on the Kenawha in Virginia. He was then quite a small boy. He has also killed buffalo on New River and near the Big Sandy in Virginia in '97 and '98."

I have thought best to be thus circumstantial in detail of persons, places and dates, in order to fix precisely an important item in the natural history of our country. But this occurrence of the buffalo in Virginia is only of a part with its general former range, as attested by accounts of other observers.—ELLIOTT COUES, *Fort McHenry, Md.*

LAND SHELLS OF WESTERN MASSACHUSETTS.—In Vol. I, of the NATURALIST, was published a paper on the "Land-Snails of New England." During the following summer I was myself engaged in making a small collection of the land-snails found at West Stockbridge, Berkshire Co., Mass., and to my surprise, many of my results were directly at variance with those given by Mr. Morse in the above-mentioned article. The reason for this difference was apparent when I considered my locality. Berkshire Co. occupies the extreme western end of Massachusetts, and therefore its fauna closely resembles that of New York; and further, it is eminently a limestone country, and for this reason, the land-snails exist in wonderful abundance. Frequently in a morning's walk I have met with twenty or thirty of the larger species and quite a number of the smaller ones. *Helix fuliginosus* Binney and *H. inornata* Say were found in great abundance and in nearly equal numbers. In some localities, near the marble quarries, I found *H. alternata* Say in wonderful profusion, but in general it was an uncommon shell. *H. tridentata* Say, of which Mr. Morse says, it "occurs only rarely in the western part of Mass.," was very common in my immediate vicinity. Next to *albolabris*, *inornata* and *fuliginosis*, it was the most common shell found. *H. monodon* was rather rare; *hirsuta* was still more so, as between myself and a friend collecting with me, we only obtained three or four specimens. Of *H. palliata*, recorded as being found at "Copperas Hill, Vt.," I found one perfect specimen; of *H. Sayii*, I found five or six perfect specimens and several bleached ones. Of the smaller shells, none could be considered common except *H. labyrinthica*, and *Zua lubricoides*. The former I found most common on moss-covered rocks, comfortably packed away in the moist earth and roots, between the moss and the rock. The latter were always found at the base of rocks, among the moist leaves and in the earth itself. Judging from the collections made by myself and friend, I should say that the relative abundance of snail shells in that locality is expressed in the following numbers: *H. fuliginosis*, ten; *inornata*, ten; *tridentata*, five; *albolabris*, four; *alternata*, three; *monodon*, three; *labyrinthica*, two; *Zua lubricoides*, two; *H. Sayii*, one; all others only occasional. This excludes the locality where *alternata* was so plenty; if that be counted, it would place that species at two or three times all the others combined. I have given these notes because they show how much local variation may exist in the distribution of the land shells, and how much the extreme western part of Mass. resembles the Middle or Western States, so far as its snail-life is concerned.—W. G. FREEDLEY, *Philadelphia.*

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*Captain of Rangers, 23 March, 1812; out of service to June 16, 1832; then made Captain of Mounted Rangers; Lieutenant Colonel, 2d U. S. Dragoons, July 25, 1850, and until death at Springfield Illinois, July 15, 1853.

CONCHOLOGICAL NOTES—Mr Stearns called the attention of the California Academy of Sciences to the indefiniteness and errors in the catalogues of various families of the Mollusca, which are being published by the Conchological Section of the Academy of Sciences of Philadelphia; these faults occur in the *habitat* of many of the species, while no new light has been thrown upon their geographical distribution. In some instances, certain West American species which he named, had a range of a *thousand miles* further north than credited in the catalogues, and in some cases species had been credited to this coast that were exotic and whose true station was *thousands of miles* away. Such errors by an American author in connection with American species, were to say the least discreditable; the errors of Reeve, Sowerby and Kiener were repeated, while the labors of our own authors were practically ignored, and their more accurate work though equally accessible, was overlooked. He presented a paper upon the subject for publication.

Mr. Stearns also gave a description of the animal of Trivia Californica, with blackboard illustrations of the same, and of the corals upon which it feeds; worn beach specimens of this Trivia are the *T. depauperata* of Sowerby.

THE FAUNA OF LAKE SUPERIOR AT GREAT DEPTHS. — An examination of the fauna of the depths of Lake Superior has been undertaken the past season by the U. S. Lake Survey, and dredging in different parts of the lake has been conducted by Mr. S. I. Smith. In all the deeper parts of the lake examined, the bottom is composed of fine clay, or clayey mud, apparently unfavorable to a great variety of life. The principal animals obtained below one hundred fathoms were, a species of Hydra, several worms, species of Ostracoda, with a few other forms of Entomostraca, one or two species of Amphipoda, a species of Mysis,* insect larvæ belonging to the dipterous genus Chironomus and a species of Pisidium. In the more shallow waters, a much greater variety of animals was obtained. The species of Mysis was found at a number of points from eight to one hundred and forty-eight fathoms, and Mr. Smith regards its occurrence only as evidence that Mysis is another to be added to the list of genera common to fresh and salt water. Dredging was carried on down to one hundred and sixty-nine fathoms, the deepest known point in the lake, and water brought up from that depth was perfectly fresh. The temperature in all the deeper parts of the lake is near 39°, or about that of the maximum density of fresh water.

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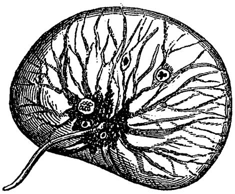
* *Mysis relicta* Lovén, and *Pontoporeia affinis* Lindst., both living in Lake Wetter in Sweden!

Sensitive Surface in Mouse's Ear. — We learn from the "Quarterly Journal of Microscopy" that Dr. Schobl, who lately published a remarkable paper on the wing of the bat, has made similar researches on the ear of the white mouse, with very interesting and surprising results. The first thing which attracted his attention was the immense richness of the ear in nerves. Even the bat's wing is but poorly supplied in comparison. Calculating from the average size of the ear of a common mouse, he found that there are on the average 3,000 nerve terminations on each of its surfaces, making 6,000 on each ear, or 12,000 altogether. The function of this elaborate arrangement would seem to be, like that in the wing of the bat, to supply by means of a very refined sense of touch the want of vision to these subterranean animals.

Fig. 121.



Development of Noctiluca. — All that has been known as to the mode of development of this minute animal (Fig. 121), that causes a great part of the phosphorescence of our seas, is that they multiply by division and internal budding. Prof. Cienkowski, as the "Quarterly Journal of Microscopy" states, has traced the formation of spores like those of some fungi, and seen them swimming around like the zoospores of sea weeds. He has also observed the mode of sexual union of these animals.

Relations of Embryology to pathology. — Dr. Dohrn reviews in the "Academy" some observations made in the Pathological Institute of Jena by Prof. W. Müller, and published in the "Jena Zeitschrift." The papers contain a singular mixture of embryology and pathology, and embrace a field of comparative embryology that has hitherto remained wholly uncultivated. In regard to the chorda dorsalis, Müller shows that it plays a secondary part in the formation of the skeleton of Vertebrates. We can very well imagine animals, Dohrn says, with bones in their interior, and even animals with a vertebrate skeleton, which present no traces of a chorda, while on the other hand we may meet with the chorda in invertebrate animals, such as the larvæ of Ascidians, which develop no trace of an internal skeleton.

Müller's papers also show that a new era in pathological anatomy is dawning, since comparative anatomy and embryology will aid in recognizing the nature of pathological processes and formations. Dohrn insists that "in addition to anatomy and physiology, which are subjects of equal importance, embryology and comparative anatomy should also be regarded as absolutely essential to the completion of medical education" and urges that a new and special chair be devoted to these subjects in medical universities and schools; and if this be a necessity for Germany, where the study of the history of development has of late years received such great extension, it holds still more for England, where scarcely any embryology is taught or made an object of study. How lamentably deficient our own medical schools are in these branches is sufficiently apparent.

Cause of Phosphorescence in Animals.—M. Panceri presented to the recent congress of naturalists and physicians at Turin (Italy) the results of some investigations as to the cause of phosphorescence in animals, and especially in fishes. He has come to the conclusion that the cause of this phenomenon is the slow oxidation of fat, which he finds to be always present when the phosphorescence is observed in animal substances. In the case of fish the oxygen of the air very readily penetrates the skin, and acts upon the subcutaneous adipose tissue. The phenomenon is promoted by placing the phosphorescent substance in oxygen, but is entirely arrested by its immersion in carbonic acid, fresh water, alcohol, or any solution not containing oxygen. Phosphorescence usually commences immediately after death, and continues until decomposition sets in, with disengagement of ammonia, when it invariably ceases.—A. W. B.

Pieris rapæ Parasite. — It will doubtless be an interesting item of intelligence to many of the readers of the Naturalist, that the parasite, so anxiously looked for, as the only hope of preserving the cabbage crop of our country from the destruction threatened it by the ravages of *Pieris rapæ*, has already entered upon its labors, and in so efficient a manner as to promise immediate beneficial results.

During the latter part of September, I was informed that a number of chrysalides of *P. rapæ* which had been collected by a gentleman in this city, with a view of obtaining specimens of the images for drawing, instead of disclosing the butterfly, gave out a number of small flies from each. Some of them having been brought to me in compliance with my request, I was delighted to find them to be of the genus *Pteromalus* which includes so many of our valued parasitic friends, and probably of the species which has been found so serviceable in Europe, in destroying the several cabbage butterflies there existing — viz., the *Pt. puparum* of Linnæus.

From the close resemblance which many of the *Pteromali* bear to one another, it is not safe to assert positively that we have really been favored with the importation of the European parasite, to aid in the work of subjugation of the European pest, but should further examination prove this to be the case, it will be not only a most interesting event in its scientific aspect, but also in the pecuniary results which must necessarily follow it.

In another number, I may give your readers the observations — quite limited, I regret — which I have been able to make on this welcome parasite. — J. A. LINTNER, *N. Y. State Museum of Nat. Hist.*

[We have also raised this parasite in considerable abundance and also received specimens from Vermont. We have likewise reared a Dipterous parasite from the cocoons. — EDS.]

THE FAUNA OF MADAGASCAR. — M. Alfred Grandidier has recently returned from his third voyage of discovery to Madagascar, and has shown that the riches and eccentricities of its fauna have not yet been exhausted. His collections, which have only recently reached the Jardin des Plantes at Paris, although brought to France before the political storm of last year commenced, have not yet been fully examined. But they are said to include very full series of several species of Lemuridæ, the comparison of which is likely to lead to important results, besides examples of a new genus of Rodentia, and many other mammals of high interest. M. Grandidier has also paid much attention to the fossil deposits of Southern Madagascar, which contain the remains of the extinct gigantic bird, *Æpyornis maxima*, and has arrived at some important results (such as the former presence of Hippopotamus in Madagascar), which may ultimately tend to modify some of the views generally held concerning the true nature of the fauna of this island and its origin. — A. W. B.

WALDHEIMIA SEPTIGERA AND TEREBRATELLA SEPTATA IDENTICAL. *To the Editors of the American Naturalist.* Sirs:—Having in the course of a too short visit to North America been honored by remarkable kindness and attention on the part of my brother naturalists in this great hemisphere, I am rather disappointed at seeing in your excellent periodical a notice of the report submitted to the Royal Society of London by my colleagues and myself on the deep-sea exploration of parts of the North Atlantic, in H. M. S. Porcupine, during the summer of 1869. The writer of that notice, Mr. W. H. Dall, criticises in what I cannot help considering over-severe terms my views "in regard of the specific and generic limits of animals;" and he gives as an instance, *Waldheimia septigera* and *Terebratella septata*, which he states belongs to different genera, although I have included both under the same specific name. I do not agree with Mr. Dall in his statement. Having had opportunities of examining the types or original specimens of *Terebratula septigera* Lovén, at Stockholm, and of *Terebratula septata* (Philippi), at Berlin, and having carefully compared these specimens with the published descriptions and figures, I am convinced that both belong not only to the same genus, but to the same species. What seems to have been in the mind of Mr. Dall when he penned his hasty critique, was that Professor Seguenza of Messina had referred a species of *Terebratella* from the Sicilian tertiaries to Philippi's species, and a species of *Terebratula* found in the same formation to Lovén's species. The former may be the *Terebratella Mariœ* of Mr. Arthur Adams from the Japanese seas; the latter I have ascertained to be rather widely distributed in the North Atlantic. I have the honor to be, Sirs, your very obedient servant,

J. GWYN JEFFREYS, *Montreal*, *Oct.* 6, 1871.

AFFINITIES OF COCCOLITHS AND OF SPONGES.—Mr. H. J. Carter has enunciated the theory that the coccoliths and coccospheres which are found in deep-sea mud, and have recently been identified as a constituent of some very ancient geological strata, are not, as held by Prof. Huxley, lowly formed animal organisms, but are of vegetable origin. This theory will, the writer considers, explain the apparent anomaly of the presence in deep seas of a large amount of animal life without vegetable organisms for their subsistence. To the same magazine in which this theory is propounded, the "Annals and Magazine of Natural History," the same authority contributes a paper on the ultimate structure of the calcareous sponges, confirming what has already been written on the same subject by Prof. H. James Clark of Lexington, Ky. The opinion of these two writers is, that the sponges as a group are most nearly allied to the Flagellate Infusoria, and not, as Prof. Hæckel has proposed, to the Cœlenterata. Mr. Carter has expressed his opinion that they are more closely related even to the compound Tunicata, a view which is, however, dissented from by Mr. W. S. Kent, who regards them as a distinct group of the Protozoa, allied on the one hand to the Flagellate Infusoria, in virtue of their uniciliated and funnel-bearing cells, and on the other to the simpler Rhizopoda, in the presence of the general pervading sarcode layer, subservient to the secretion of the common supporting skeleton. While opposed to Prof. Hæckel's proposition of uniting the Spongiadæ and Cœlenterata under one sub-kingdom, Mr. Kent does not deny to the latter the position of the next round of the ladder in the ascending scale of organized beings, though he at present considers there are too many links missing to permit of their fusion.—A. W. B.

LACORDAIRE'S COLEOPTERA.—I learn from that agreeable source of entomological information, the "Petite Nouvelles Entomologiques," that M. Chapuis has undertaken to complete M. Lacordaire's great work, which was interrupted by the lamented death of its talented author. M. Chapuis wishes to obtain specimens of the following genera, in which he is still deficient:—Megamerus, Prionesthis, Rhynchostomis, Atalesis, Ametella, Chiloxena, Polyoptilus, Macrolema, Eubaptus and Ateledera, etc. I am informed that our friend, Mr. J. S. Baly, who possesses the finest collection of Chrysomelidæ in the world, has offered it to M. Chapuis to make every use of; and I trust other entomologists will follow so generous an example.—*Newman's Entomologist.*

THE STILT SANDPIPER IN MASSACHUSETTS.—A single specimen of this species, *Micropalama himantopus*, was taken here by Albert E. Mills, at Blacksmith pond, July 24, the present year. This is the first recorded instance of its capture in this State, although its occurrence had been anticipated. (Proceedings Essex Inst., V, 294, and AMER. NAT., III, 639.) It was in company with a solitary sandpiper, *Rhyacophilus solitarius*, which was also secured. Both were adult females.—OTIS FULLER, *Needham, Mass.*

GIGANTIC SALAMANDER FROM CHINA. — Father David, a missionary priest of the order of Lazarists, for many years resident at Pekin, and an enthusiastic naturalist, has discovered in China, besides several new and extremely interesting species of animals, a gigantic aquatic salamander, allied to the great Sieboldia of Japan. The remains of a closely allied reptile (Andrias) are found in the tertiary fresh water deposits of Central Europe.

NEW HABITAT OF HELIX LINEATA. — Among the North American landshells that are remarkable for a wide range of distribution is the little *Helix* (Hyalina?) *lineata* of Say, already credited with a range in latitude from "Gaspé to Texas," with a longitude from the Atlantic to "New Mexico." I was much surprised to find specimens in a box of Helices recently collected on the banks and in the neighborhood of Salmon River, Idaho, and sent to me by Henry Hemphill, Esq. The internal peripheral teeth I should judge to be coincident with varical development or periodical growth, and rather eccentric in occurrence and number; not always being in "pairs"* — but sometimes showing only one. — R. E. C. STEARNS.

NEW ENTOMOLOGICAL BOOKS. — The 14th fasciculus of Mulsant's "Opuscula Entomologica" is just published. The 3rd volume of the "Natural History of the Hemiptera of France" will be ready in a few days, and will contain four tribes. M. Mulsant has published the new edition of his "History of the Lamellicorns of France," as well as the 1st part of the "Staphylinidæ." A new edition of the "Iconography and Natural History of Larvæ of Lepidoptera," by MM. Duponchel and Guenée, is about to be issued: the work gives descriptions and figures of a great number of the larvæ of European Lepidoptera, of course including English species; these figures are contained in ninety-three plates, excellently coloured: the work is published in forty fasciculi, at one franc each. Of the Iconography and Description of unpublished Lepidoptera of Europe, by P. Millière, twenty-five fasciculi have been published, and these contain more than a thousand descriptions of larvæ, pupæ and perfect insects, with the plants on which the larvæ feed, and other details of their life-history: the work is worthy the support of all lovers of the science; nothing can exceed the delicacy and finish of the figures.—*Newman's Entomologist.*

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*Vide Binney and Bland's Land and Fresh Water Shells of North America, Part I, p. 82, fig. 84. — Smithson. Pub.

GEOLOGY.

THE DRIFT PERIOD.—In a paper read at the Lyceum of Natural History, New York Oct. 24, 1870, Prof. Newberry observed:—In the sequence of events included in our Drift period there is a marked break, a middle period, during which, over most of the north-western states, no Drift deposits were made, and when most of this area was covered with a forest growth and sustained many and large animals. At a subsequent period, all parts of this area, less than five hundred feet above the highest of our present great lakes was submerged, and most portions of it covered to greater or less depth, with new Drift deposits, clays, sands, gravel and boulders, a large part of northern and remote origin. Nearly all the large boulders of the Drift belonging to this later epoch are sometimes of great size (one hundred tons) and have been *floated* to their present positions, as they overlie undisturbed stratified sands and clays, which would have been broken up and carried away by glaciers or currents of water moving with sufficient velocity to transport these blocks. Hence they must have been floated from the Canadian highlands, the place of origin of most of them, by *icebergs.* This epoch of the Drift period I have therefore termed the Iceberg Epoch. During this epoch the submergence of the land in the interior of the continent, was greater than in the epoch of the deposition of the Champlain and Erie clays, and all the area north of the Ohio was covered with water np to a height of over five hundred feet above Lake Erie, or one thousand one hundred feet above the ocean level. The highlands of south eastern Ohio, and most of the country south of the Ohio river were not covered by this flood and now bear no drift deposit of any kind. Tracing out the line of ancient water-surface, we find that the depression was greater towards the north, so that the Alleghanies and their foot-hills, and also a wide area of comparatively low country in the southern states formed not only a shore, but a continental limit to the great interior iceberg-ridden sea of the later Drift Epoch. In the western reaches of this sea, which was of fresh water in the later centuries of its existence, was deposited the Lŏess or "Bluff" which I have elsewhere desig-